

**U.S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE**

**SPECIFICATION**

**SHELTER, FIRE, PRACTICE, M-2002**

**1. SCOPE AND CLASSIFICATION**

1.1 Scope. This specification covers the Model 2002 practice fire shelter and the polyvinyl bag used to encase it.

1.2 Classification. The practice fire shelter components shall be classified as follows:

Type I - Practice Fire Shelter, Complete with Polyvinyl Bag, Carrying Case and Liner

Type II - Practice Fire Shelter

Type III - Polyvinyl Bag, Practice Fire Shelter

**2. APPLICABLE DOCUMENTS**

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

**SPECIFICATIONS**

**FEDERAL**

A-A-55126 - Fastener Tape, Hook and Pile, Synthetic

V-T-295 - Thread, Nylon

A-A-55308 - Cloth and Strip, Laminated or Coated, Vinyl or Polyester High Strength,  
Flexible

**MILITARY**

MIL-W-17337 - Webbing, Textile, Woven Nylon

MIL-PRF-5038 - Tape, Textile and Webbing, Textile, Reinforcing Nylon

MIL-W-27265 - Webbing, Textile, Woven Nylon, Impregnated

MIL-DTL-32075 - Label: For Clothing, Equipage, and Tentage (General Use)

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, 5785 Highway 10 West, Missoula, MT 59808, by using the Specification Comment Sheet at the end of this document or by letter.
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FOREST SERVICE

5100-86 - Cloth, Duck, Nylon (Polyurethane Coated)

5100-610 - Liner, Carrying Case, Fire Shelter M-2002

5100-612 - Carrying Case, Practice Fire Shelter, M-2002

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Department of Defense Single Stock Point (DODSSP), Building 4/Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Forest Service specifications are available from the preparing activity, see 6.4.)

2.1.2 Government drawings. The following Government drawings form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

DRAWINGS

USDA FOREST SERVICE

MTDC-1005 - Shelter, Fire, Practice, M-2002

MTDC-1006 - Bag, Polyvinyl, Practice Fire Shelter, M-2002

(Copies are available from the preparing activity, see 6.4.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies are available from the American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 751 - Standard Test Methods for Coated Fabrics  
D 882 - Standard Test Methods for Tensile Properties of Thin Plastic Sheeting  
D 1004 - Standard Test Methods for Initial Tear Resistance of Plastic Film and Sheeting  
D 1203 - Standard Test Methods for Volatile Loss from Plastics Using Activated Carbon Methods  
D 1974 - Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Shipping Containers  
D 3951 - Standard Practice for Commercial Packaging  
D 5118 - Standard Practice for Fabrication of Fiberboard Shipping Boxes  
D 6193 - Standard Practice for Stitches and Seams  
SI-10 - Standard For Use of the International System of Units(SI): The Modern Metric System (IEEE/ASTM Standard available from ASTM)

(Copies are available from ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Copies are available from American Trucking Associations, Inc., 2200 Mill Rd., Alexandria, VA 22314.)

(Non-Government standards and other publications normally are available from the organizations that prepare and distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), the practice fire shelter shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials and components. The practice fire shelter and polyvinyl bag shall conform in all respects to the design, details, dimensions, and materials specified herein and in the referenced drawings, MTDC-1005 and MTDC-1006. Should there be a conflict between the text of this document and the drawings, this document takes precedence unless otherwise specified in the contract or purchase order.

3.2.1 Basic cloth. The basic cloth for the practice fire shelter shall consist of an open mesh, woven polyethylene scrim laminated between two layers of polyethylene film. The mesh (3.2.1.1) and film (3.2.1.2) shall be selected so that the laminate meets the requirements specified in table I.

3.2.1.1 Polyethylene mesh. The high density polyethylene mesh shall be constructed of nominal 900 denier yarns with a minimum of 9 yarns per inch in both the warp and filling direction. The color shall be natural.

3.2.1.2 Polyethylene film. The polyethylene film for both the face and back of the laminated cloth shall be 1.5 mils thick. The color shall be green to match the standard shade sample (6.5).

3.2.1.3 Physical requirements. The finished cloth shall conform to the requirements in table I when tested as specified in 4.5.1.

Table I. Physical requirements, finished cloth

Characteristics	Requirements	Test
Yarn count (denier)	900	FED-STD-191 Method 4021
Yarns per inch (both directions)	9	FED-STD-191 Method 5050
Film thickness, mils (minimum)	6.0	FED-STD-191 Method 5030
Weight oz./sq. yd. (basic cloth)	4.0 to 4.8	FED-STD-191 Method 5041
Breaking Strength, lbs. (minimum)		FED-STD-191 Method 5100
Warp	140	
Filling	125	
Tearing Strength, lbs. (minimum)		ASTM D 751 Procedure B
Warp	30	
Filling	28	
Bursting Strength, psi (minimum)	180	ASTM D 751
Hydrostatic Resistance psi (minimum)	60	ASTM D 751 Procedure A
Laminate thickness, mils (min)	6.0	FED-STD-191 Method 5030
Blocking Scale Readings (max)	3	FED-STD-191 Method 5872

3.2.2 Binding tape, 1 inch, nylon. The 1 inch wide binding tape shall be type III, class 2 conforming to MIL-PRF-5038. The color shall be black.

3.2.3 Thread, Nylon. The thread for all stitching shall be type II, class A, size E conforming to V-T-295. The color shall be black.

3.2.4 Plastic film. The film used to fabricate the polyvinyl bag shall be a single layer formed from chlorine-bearing vinyl resin. The film shall be colorless and intended for use in a temperature range of 0°F to 130°F. Only phosphate, phthalate, or both, plasticizers shall be used. The use of water soluble compounding ingredients is prohibited. The film shall meet the requirements of table II when tested as specified in 4.5.2.

Table II. Physical requirements of Polyvinyl film

Characteristic	Requirement	Test
Thickness	0.020 $\pm$ 0.002 inch	Direct measurement
Tensile strength	2200 psi, minimum	ASTM D 882 <u>1/</u>
Ultimate elongation - machine direction	200% minimum	ASTM D 882 <u>1/</u>
Ultimate elongation - transdirection	250% minimum	ASTM D 882 <u>1/</u>
Tear resistance, Graves (both directions)	7.5 lbs. Minimum	ASTM D 1004
Clark Stiffness at 34°F $\pm$ 2°F	22	FED-STD-191, Method 5204
Extraction in soapy water	2.0% maximum	4.5.1.1
Blocking at 158°F	No. 2 maximum	FED-STD-191, Method 5872 <u>2/</u>
Volatility	2% maximum	ASTM D 1203
Resistance to weathering	3.2.4.1	FED-STD-191, Method 5670 <u>3/</u>
Cold crack at 0° $\pm$ 2°F	3.2.4.2	FED-STD-191, Method 5874
Dimensional stability	7% maximum change	4.5.1.2

1/ 1 inch wide specimen.

2/ Test shall be performed at 158°  $\pm$  2°F for a period of 48 hours.

3/ For 100 hours.

3.2.4.1 Resistance to weathering. When tested as specified in table II, the polyvinyl film shall show no appreciable stiffening, cracking, crazing, discoloration, tackiness, or exudation of plasticizer from the film. Appreciable shall mean a change that is immediately noticeable in comparing the tested specimen with the original.

3.2.4.2 Cold crack. When tested as specified in table II, the polyvinyl film shall show no evidence of cracking.

3.2.5 Pull tab. The pull tab shall conform to type I, class 1 of A-A-55308. The color shall be red.

3.2.6 Hook and loop fastener tapes. Fastener tapes of 3/4 inch, 1 inch and 1-1/2 inch widths are required. All fastener tapes shall conform to type II, class 1 of A-A-55126. The color of the 3/4 inch and 1 inch shall be black, the color of the 1-1/2 inch shall be red.

3.2.7 Webbing, nylon, 2 inch. The pull strap shall be composed of 2 inch nylon webbing conforming to MIL-W-17337. The webbing shall be resin impregnated conforming to class R treatment of MIL-W-27265. The color shall be black. The loop fastener tape shall be 1 inch width (see 3.2.6).

3.2.8 Shake handles. The shake handles shall be composed of nylon cloth in accordance with Type III of Forest Service Specification 5100-86. The color shall be yellow.

3.3 Construction. Construction of the practice fire shelter and polyvinyl bag shall conform in all respects to drawings MTDC-1005 and MTDC-1006, and as specified herein.

3.3.1 Splicing. No splicing of materials is allowed.

3.3.2 Type of stitching. All stitching shall conform to stitch type 301 of ASTM D 6193, 4 to 6 stitches per inch.

3.3.2.1 Type 301 stitching. Ends of all stitching shall be backstitched a minimum of 1 inch except where ends are turned under in a hem or held down by other stitching. Thread tension shall be maintained so that there will be no loose stitching resulting in loose bobbin or top thread, or excessively tight stitching resulting in puckering of the materials sewn. The lock shall be embedded in the materials sewn.

3.3.2.1.1 Repairs of type 301 stitching. Repairs of type 301 stitching shall be as follows (when making the following repairs, the ends of the stitching are not required to be backstitched):

- a. When thread breaks or bobbin runouts occur during sewing, the stitching shall be repaired by restarting the stitching a minimum of 1 inch back of the end of the stitching.
- b. Thread breaks, or two or more consecutive skipped or runoff stitches noted during inspection of the item (in-process or end item), shall be repaired by overstitching. The stitching shall start a minimum of 1 inch in back of the nonconforming area, continue over the nonconforming area, and continue a minimum of 1 inch beyond the nonconforming area onto the existing stitching. Loose or excessively tight stitching shall be repaired by removing the nonconforming stitching, without damaging the materials, and restitching in the required manner.

3.3.2.2 Automatic stitching. Automatic machines may be used to perform any of the required stitch patterns, provided the requirements for the stitch pattern, stitches per inch, size and type of thread are met; and at least three or more tying overlapping or backstitches are used to secure the ends of the stitching.

3.3.2.3 Thread ends. All thread ends shall be trimmed to 1/4 inch maximum length.

3.3.2.4 Stitching margins. Unless otherwise specified, all stitching margins shall be 1/8 inch.

3.3.2.5 Bartacks. Unless otherwise specified, bartacks shall be  $5/8 \pm 1/16$  inch long,  $1/8 \pm 1/32$  inch wide and contain  $28 \pm 2$  stitches per bartack.

3.3.2.6 Lubrication of thread. There shall be no lubrication of the thread by any means, before or during sewing (see 4.3.2).

3.3.3 Shake handles. Two shake handles (3.2.8) shall be sewn on the practice shelter in the location shown on MTDC-1005 using the nylon thread (3.2.3). The handles shall be marked on both sides with "LEFT HAND" in black letters and "RIGHT HAND" in red letters as shown in MTDC-1005. The letters shall be 1/2 inch minimum in height. The markings shall meet the requirements of type IV, class 9 of MIL-DTL-32075, except that the marking shall be white.

3.3.4 Polyvinyl bag. The polyvinyl bag shall be constructed as shown in drawing MTDC-1006, and as specified by this specification.

3.3.4.1 Breaks, tear, holes. The surface of the polyvinyl bag shall have no breaks, tears, or holes.

3.3.4.2 Main panel opening. After sewing fastener tapes to the polyvinyl bag main panel, the opening shall be constructed by slitting the panel in the location shown on drawing MTDC-1006. The slit shall be straight, and the slit edges shall be smooth and continuous. It is optional to the manufacturer whether the binding tape is sewn to the main panel before or after the main panel is slit. It is optional to the manufacturer to end the slit at the binding tape rather than under it as shown on MTDC-1006.

### 3.4 Marking.

#### 3.4.1 Shelter.

3.4.1.1 Label. Each practice fire shelter shall be marked with a sewn-on type identification label in the location shown on drawing MTDC-1005. The label shall be type VI, class 6 of MIL-DTL-32075 with the exception that the contents shall be as required below. A duplicate label shall be inserted into the packaging bag (5.2.1) so it can be read without opening the bag. The contents shall dictate label size and shall be in the following format:

**SHELTER, FIRE, PRACTICE, M-2002**  
**NSN 6930-01-499-0608**  
**USFS Spec. 5100-611**  
**[CONTRACT NO.]1/**  
**[MANUFACTURER'S NAME]1/**  
**DATE OF MANUFACTURE: [mm/yy]1/**  
**NOT FOR FIRE USE**

1/ Contractor shall insert appropriate information.

3.4.1.2 Fold line markings. The shelter shall have the fold lines directly marked on the practice fire shelter fabric as shown in MTDC-1005. The marks shall be in accordance with the applicable requirements of type VI, class 9 of MIL-DTL-32075.

3.4.2 Closure strap. Each end of the polyvinyl bag closure strap shall be marked with a sewn-on type label with the inscription "NOT FOR FIRE USE" in the size and location shown on drawing MTDC-1005. The label shall meet the requirements of type VI, class 9 of MIL-DTL-32075 except that the fastness of the class 9 markings shall be as specified for class 5 markings. Characters shall be a minimum of 5/16 high and black in color.

3.4.3 Pull strap. The pull strap shall have a sewn-on type label with the inscription "NOT FOR FIRE USE" in the size and location shown on drawing MTDC-1005. The label shall meet the requirements of type VI, class 9 of MIL-DTL-32075 except that the fastness of the class 9 markings shall be as specified for class 5 markings. Characters shall be a minimum of 5/16 high and black in color.

3.5 Workmanship. The finished shelter and polyvinyl bag shall conform to the quality of product established by this specification. The occurrence of nonconformities shall not exceed the applicable acceptable quality levels.

3.6 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch/pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of IEEE/ASTM SI-10, and all other requirements of this specification are met.

3.7 Recovered materials. The contractor is encouraged to use recovered material in accordance with Federal Acquisition Regulation 23.4 to the maximum extent practical.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations or tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known nonconforming material, either indicated or actual, nor does it commit the Government to accept nonconforming material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.1.3 Certification of compliance. Unless otherwise specified, certificates of compliance supplied by the manufacturer of the item, component, or material, listing the specified test method and test results obtained, may be furnished in lieu of actual lot by lot testing performed by the contractor (see 4.3.2). Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with ASQC Z1.4. The inspection level and acceptable quality level (AQL) shall be as specified.

4.3 Quality conformance inspection. Each end item lot shall be sampled and inspected as specified in 4.3.3.1 and 4.3.3.2. Unless otherwise specified (see 6.2), the first articles submitted in accordance with 3.1 shall be inspected as specified in 4.3.3.1 and 4.3.3.2. The presence of any nonconformity or failure to pass any test shall be cause for rejection of the first articles.

4.3.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.



4.3.2 Certification. Unless otherwise specified (see 6.2), the contractor may provide certificates of compliance for all materials and components in lieu of actual lot by lot testing. The contractor shall provide certificates of compliance for the following components:

Fire shelter basic cloth (with test reports) (3.2.1)

1 inch nylon binding tape (3.2.2)

Nylon thread (3.2.3)

Plastic film (3.2.4)

Pull tab (3.2.5)

Hook and loop fastener tape (3.2.6)

2 inch nylon webbing (3.2.7)

Nylon cloth (3.2.8)

Label (3.4.1.1)

Fold markings (3.4.1.2)

Closure strap markings (3.4.2)

Pull strap markings (3.4.3)

No thread lubricant (3.3.2.6)

All certificates shall include as a minimum:

Product description, including specification, type, class, and form when applicable

Quantity purchased

Purchase source, address, and telephone number

Purchase date

Lot number traceable to materials used in production

Contract number

4.3.3 End item examination. A sample unit shall be one finished practice fire shelter enclosed in a polyvinyl bag. The inspection levels and acceptable quality levels (AQLs) shall be as specified. Unless otherwise specified, nonconformities shall be scored on an individual basis, i.e., each seam, each stitching end, each dimension, etc.

4.3.3.1 End item visual examination. The completely fabricated practice fire shelter shall be examined for the nonconformities listed in table III. The inspection level shall be I and the AQL, expressed in terms of nonconformities per hundred units, shall be 4.0 for major nonconformities, and 15.0 for major and minor nonconformities combined.

TABLE III. End Item nonconformities

Examine	Nonconformities	Classification	
		Major	Minor
Basic cloth	Any hole, cut, or tear		X
	Any blister or delamination		X
	Any film missing--based cloth exposed		X
	Any objectionable odor		X
	Any embedded foreign matter		X
	Uneven thickness clearly noticeable		X
	Tackiness (film surface will adhere and not readily unroll)		X
	Any abrasion mark clearly visible at normal inspection distance (3 feet)	X	
	Needle chews on body of shelter or sod cloth	X	
	Color not as specified		X
(cont)			

5100-611

TABLE III. End Item nonconformities (continued)

Classification Examine	Nonconformities	Major	Minor
Binder Tape	Any hole, cut, or tear Frayed or scalloped edges not firmly or tightly woven Needle chews: - up to 1/2 inch in length - over 1/2 inch in length	X   X	 X  X
Polyvinyl bag	Any break, hole, or tear Main panel slit not straight, smooth, and continuous Pull strap not as specified	 X X	X
Fastener tape	Size or type not as specified Location not as specified Color not as specified	X X	  X
Thread	Not type, class, or size specified Color not as specified	X	 X
Open Seams	Up to and including 1/2 inch More than 1/2 inch  Note: A seam shall be classified as an open seam when one or more stitches joining a seam are broken, or when two or more consecutive skipped stitches or runoffs occur.	  X	  X
Joining seams	Any ply of cloth not securely caught in seam stitching by: - more than 1/4 inch up to and including 1/2 inch - more than 1/2 inch	 X X	
Seams and stitch type	Wrong seam or stitch type Seams pleated or puckered	X	 X
Stitching	Loose, resulting in loose bobbin or top thread Tight, resulting in tightness or puckering of material		X X
	NOTE: Nonconformities to be scored only when the condition exists for a continuous 4 inches or more, or in several areas with an accumulated distance of 8 inches or more. Applicable to individual seams.		
Stitches per inch	One or more stitches less than minimum specified One stitch in excess of maximum specified Two or more stitches in excess of maximum specified X	X	  X
(cont)			

TABLE III. End Item nonconformities (continued)

Classification Examine	Nonconformities	Major	Minor
	<p>Note: Variation in the number of stitches per inch caused by operator speeding up the machine and pulling the material in order to sew over heavy places, or in turning corners shall be classified as follows:</p> <p>(a) Within the minor nonconformity classification - No nonconformity.</p> <p>(b) Within the major nonconformity classification - Minor nonconformity.</p>		
Rows of stitching	Any row omitted (unless otherwise classified herein)	X	
Thread breaks, skipped stitches or runoffs	<p>Stitching (other than box-x stitching) overstitched less than 1 inch in each direction beyond nonconforming stitching area</p> <p>Box-x stitching overstitched less than 1/2 inch in each direction beyond the nonconforming stitching area</p>		<p>X</p> <p>X</p>
	Note: Thread breaks, or two or more consecutive skipped or runoff stitches, not overstitched shall be classified as open seams.		
Stitching ends (not turned under in a hem or held down by other stitching)	<p>Not backstitched or secured</p> <p>Backstitched less than 1/2 inch or not secured as specified (3 tying, overlapping or backstitches, when stitching is done on automatic machines)</p>	X	X
Box-x stitching	<p>One row of stitching missing</p> <p>Two or more rows of stitching missing</p> <p>Size not as specified on drawing</p>	X	<p>X</p> <p>X</p>
Components and assembly	Any component part or required operation omitted or not as specified (unless otherwise classified herein)	X	
Labels	Omitted, incorrect, illegible, misplaced, or size of characters not as specified		X
Cleanness	<p>Any noticeable grease or oil stains</p> <p>Thread ends not trimmed to 1/4 inch or less throughout</p>		<p>X</p> <p>X</p>

4.3.3.2 End item dimensional examination. The end items shall be examined to determine compliance with the applicable dimensions specified in table IV. Any nonconformance shall be considered a nonconformity. The lot size shall be expressed in units of practice fire shelters. The sample unit shall be one fire shelter in its polyvinyl bag. The inspection level shall be S-3 and the AQL, expressed in terms of nonconformities per hundred units, shall be 6.5 for major nonconformities and 15.0 for major and minor nonconformities combined.

TABLE IV. <u>End item dimensional nonconformities</u>		Classification	
Examine	Nonconformity	Major	Minor
Overall dimensions	Finished dimensions less than dimensions specified	X	
All other dimensions	Not within specified tolerance		X
	Hold down straps not centered		X
Final folded dimensions	Not within specified tolerance	X	
	Not folded as specified	X	

4.4 Packaging examination. The fully packaged end items shall be examined for the nonconformities listed below. The sample unit shall be one shipping container fully prepared for delivery except that it need not be closed. Nonconformities of closure listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL, expressed in terms of nonconformities per hundred units, shall be 2.5.

<u>Examine</u>	<u>Nonconformity</u>
Markings	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing or not as specified.
Workmanship	Any component damaged, affecting serviceability.
	Inadequate application of components, such as: incomplete closure of container flaps, improper taping, loose strapping, inadequate stapling.
Contents	Bulged or distorted container.
	Number per container is more or less than required.

#### 4.5 Tests

4.5.1 Component testing of the basic polyethylene cloth. The methods of testing specified in table I shall be followed. The physical and chemical values specified in section 3, except where otherwise specified, apply to the results of the determinations made on the sample unit for test purposes as specified in the applicable test methods. All test reports shall contain the individual values utilized in expressing the final result. The lot size shall be expressed in units of 1 yard. The sample unit for test purposes shall be 2 continuous yards full width of the finished cloth. The lot shall be unacceptable if one or more sample units fail to meet any of the test requirements specified. The sample size shall be in accordance with the following:

<u>Lot size (yards)</u>	<u>Sample size (units)</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

4.5.2 Component testing of the polyvinyl chloride film. The physical and chemical values specified in 3.2.4 and Table II, except where otherwise specified, apply to the results of the determinations made on the sample unit for test purposes as specified in the applicable test methods. All test reports shall contain the individual values utilized in expressing the final result. The lot size shall be expressed in units of 1 yard. A sample unit shall be of sufficient size for completion of all required tests. The lot shall be unacceptable if one or more sample units fail to meet any of the test requirements specified. The sample size shall be in accordance with the following:

<u>Lot size (yards)</u>	<u>Sample size (units)</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

4.5.2.1 Extraction in soapy water. The extraction test shall be performed by immersing a weighed sample of film, 4 inches square, in 400 cc of 1 percent soap solution for 24 hours at  $122^{\circ} \pm 2^{\circ}\text{F}$  and determining weight loss. The sample shall be conditioned for 3 hours at  $122^{\circ} \pm 2^{\circ}\text{F}$ , cooled to room temperature in a dessicator, immediately weighed and placed in the test solution. The sample shall be held in such a manner that the entire surface is exposed to the test solution. Upon removal from the test solution the sample shall be wiped dry, reconditioned and weighed as done initially. The soap shall be neutral toilet soap. All weighings shall be made to the nearest 0.0005 gram.

4.5.2.2 Dimensional stability. Dimensional stability shall be determined by exposing a 10" x 10" sample of film to  $212^{\circ} \pm 2^{\circ}\text{F}$  for 30 minutes in a circulating air oven. The sample shall be cut from the center of the film sheet with an accuracy of  $\pm 0.02$  inches in all directions. The sample shall be placed between 2 sheets of heavy wrapping paper lightly dusted with talc, the sheets shall have the edges secured in a way that does not restrict the sample. The prepared sample shall be exposed in the oven in a horizontal manner. After the oven exposure the sample shall be cooled to room temperature and measured to the nearest 0.01 inch along both axis.

## 5. PACKAGING

5.1 Preservation. Preservation shall be in accordance with ASTM D 3951 and as specified herein and in the contract or purchase order.

5.1.1 Folding. Each practice fire shelter shall be folded in accordance with sheet 6 of drawing MTDC-1005.

## 5.2 Packaging.

5.2.1 Type I. When the type I, the complete practice fire shelter (NSN 6930-01-499-6065), is ordered, the practice fire shelter, folded as specified by 5.1.1, shall be inserted into the top of a polyvinyl bag meeting the requirements of 3.3.4. The end of the folded practice fire shelter with the shake handles extending from it shall be located at the top (open) end of the polyvinyl bag. A label as specified in 3.4.1 shall be inserted into the polyvinyl bag so as to permit ready identification and the polyvinyl bag top shall be closed. The assembly shall be inserted into a liner meeting the requirements of 5100-610 (NSN 8465-01-498-3191) so that the pull handle extends out the top, and the complete assembly inserted into a Practice Fire Shelter Carrying Case meeting the requirements of 5100-612 (6930-01-499-0614). The pull handle shall protrude and the hook and loop fasteners on the pull handle shall mate appropriately with the hook and loop fasteners on the carrying case top and body. The slide keepers shall be closed.

5.2.2 Type II. When type II is ordered, the practice fire shelter only (NSN 6930-01-499-0608), each practice fire shelter, folded as specified in 5.1.1, shall be wrapped with twine or tape to prevent the shelter from unfolding. The secured shelter shall be inserted into a plastic bag, a label as specified in 3.4.1.1 shall be inserted prior to closing so that it can be read. The bag shall then be sealed.

5.2.3 Type III. When type III, the polyvinyl bag only (NSN 6930-01-499-0618), is ordered, the complete bag, folded flat, shall have the closure strap with pull tab properly attached as shown in drawing MTDC-1006.

## 5.3 Packing.

5.3.1 Type I. Ten (10) complete Practice Fire Shelter assemblies, packaged as specified in 5.2.1, shall be packed together in a close-fitting fiberboard box, minimum burst strength 250 psi, meeting the requirements of the latest version of ASTM D 5118. Boxes shall be in compliance with the National Motor Freight Classification. Each box shall be closed in accordance with the latest version of ASTM D 1974, except that the inspection shall be in accordance with 4.4.

5.3.2 Type II. Ten (10) practice fire shelters packaged as specified in 5.2.2, shall be packed together in a close-fitting fiberboard box, minimum burst strength 200 psi, meeting the requirements of the latest version of ASTM D 5118. Boxes shall be in compliance with the National Motor Freight Classification. Each box shall be closed in accordance with the latest version of ASTM D 1974, except that the inspection shall be in accordance with 4.4.

5.3.3 Type III. One hundred (100) polyvinyl bags, prepared as specified in 5.2.3 bags shall be packed in a close-fitting fiberboard box, minimum burst strength 275 psi, and shall be in compliance with the National Motor Freight Classification.

5.4 Marking. In addition to any special marking required by this specification, marking shall be in accordance with the contract or purchase order (see 6.2).

## 6. NOTES

6.1 Intended use. The practice fire shelter is a training aid intended to improve the speed with which firefighters deploy the actual fire shelter. The practice fire shelter is flammable and should never be carried or used around any heat source, including wildland fires.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Type
- c. When a first article is not required (see 3.1, 4.3, and 6.3).
- d. Preservation, packing, and marking required in addition to specification requirements (see section 5).
- e. When actual lot by lot testing of materials and components is required (see 4.3.2).

6.3 First article. When first articles are required, they shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article shall consist of three complete practice fire shelters enclosed in the reusable polyvinyl bags. They shall be preproduction samples. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should include specific instructions regarding arrangements for selection, inspection, and approval of the first articles.

6.4 Preparing Activity. USDA Forest Service, Missoula Technology and Development Center (MTDC), 5785 Highway 10 West, Missoula, MT 59808.

6.5 Standard shade sample. Shade samples for the practice fire shelter are available from the preparing activity (6.4) by the contractor only.





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